NOTICE

All drawings located at the end of the document.

CLOSURE PLAN
Inactive Interim Status Facilities

BUILDING 444 ACID DUMPSTERS
SWMU # 207

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant
Golden, Colorado

October 3, 1988

Prepared By:

ROCKWELL INTERNATIONAL
Aerospace Operations
Rocky Flats Plant

ROY F. WESTON, INC.

CHEN & ASSOCIATES, INC.

ADMIN RECORD

Volume XXI

CLOSURE PLAN

INACTIVE INTERIM STATUS FACILITIES

ACID DUMPSTERS, BUILDING 444
SWMU REFERENCE NUMBER 207

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October 3, 1988

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1.0 INTRODUCTION

1.1 Description of the Rocky Flats Plant

1.1.1 Location and Operator

The U.S. Department of Energy's Rocky Flats Plant is located in north-central Colorado, northwest of the City of Denver (Figure 1). The plant is located in Sections 1 through 4 and 9 through 15 of T. 2S., R. 70 W. The facility's EPA identification number is CO7890010526. The mailing address is:

U.S. Department of Energy
Rocky Flats Plant
P.O. Box 928 Golden, Colorado 80402

The facility contact is:

Albert E. Whiteman, Area Manager
Phone: (303) 966-2025

The facility covers approximately 6,500 acres of federally owned land in northern Jefferson County, Colorado, which is centered at 105° 11' 30" west longitude, 39° 53' 30" north latitude The facility is approximately sixteen miles northwest of Denver and nine to twelve miles from the neighboring communities of Boulder, Broomfield, Golden and Arvada It is bounded on the north by State Highway 128, on the west by a parcel of land east of State

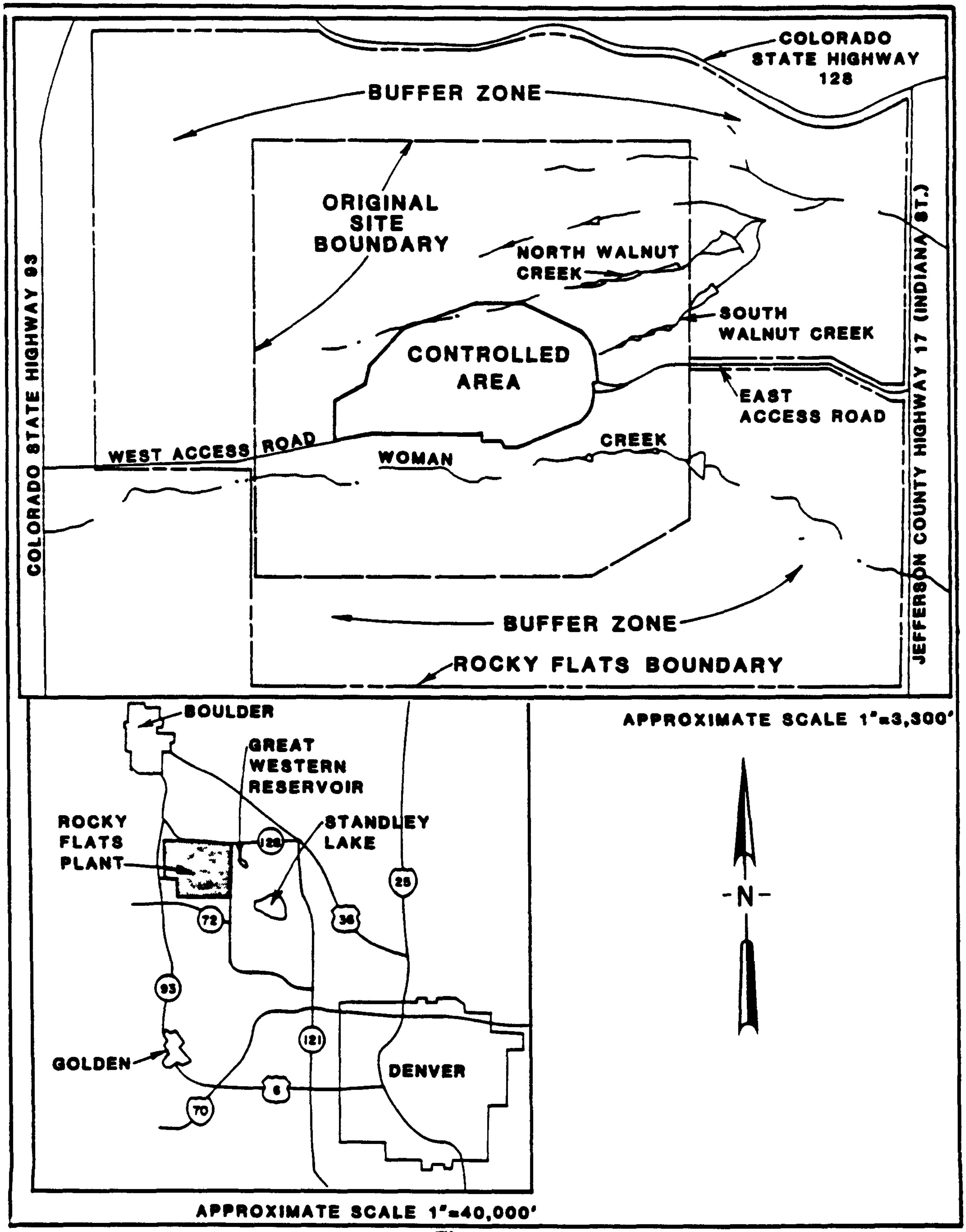


Figure 1

Vicinity Map

Highway 93, on the south by a parcel of land north of State Highway 72 and on the east by Jefferson County Highway 17. Access to the plant is from an east access road exiting from Jefferson County Highway 17 and a west access road exiting from State Highway 93.

The facility is situated at an elevation of approximately 6,000 feet. It is on the eastern edge of a geological bench known locally as Rocky Flats. The bench is approximately five miles wide and flanks the eastern edge of the foothills of the Rocky Mountains.

1.1.2 Mission

The Rocky Flats Plant is a government-owned and contractor-operated facility. It is part of a nationwide nuclear weapons research, development and production complex administered by the Albuquerque Operations Office of the U.S. Department of Energy (DOE). The prime operating contractor for the Rocky Flats Plant is Aerospace Operations of Rockwell International.

The facility produces metal components for nuclear weapons; therefore, its product is directly related to national defense The facility fabricates components from plutonium, uranium, beryllium and stainless steel Other production activities include chemical recovery and purification of recyclable transuranic radionuclides, metal fabrication and assembly and related quality control function. Other activities include research and development in metallurgy, machining, non-destructive testing, coatings, remote engineering, chemistry and physics. Parts at the plant are shipped elsewhere for final assembly (U.S. Department of Energy, 1987a).

1.1.3 Brief History

Construction of the Rocky Flats Plant was approved by the U.S. Government in 1951 as an addition to the nation's nuclear weapons production complex. Operations began in 1952 under direction of the Atomic Energy Commission. The original facility covered an area of approximately 2,520 acres. A buffer zone was added in 1974-1975 to enlarge the plant to its present size of approximately 6,550 acres. The buffer zone had been used for grazing cattle and horses and is enclosed within a cattle fence which is posted with signs indicating restricted access. Two office buildings, a warehouse, firebreaks, holding ponds along three watercourses, environmental monitoring instrumentation, a sanitary landfill area, a salvage yard, power lines, inactive gravel pits, clay pits and two target ranges are located in the buffer zone.

Major facility structures are located in a 400-acre controlled area near the center of the property. Production, research and development facilities at the plant are located in the controlled area which contains approximately 134 structures with a combined floor space of approximately 2.67 million square feet.

1.2 Content of Closure Plans

This document contains the closure plan for Building 444 Acid Dumpsters, solid waste management unit reference number 207. The location of this unit within the Rocky Flats complex is shown in Figure 2.

The objective of the closure plan for this unit is to meet the performance standards for closure specified in 6 CCR 1007-3, Section 265.111. The standards require that a facility must be closed in a manner that

- o minimizes the need for further maintenance, and
- o controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or the atmosphere.

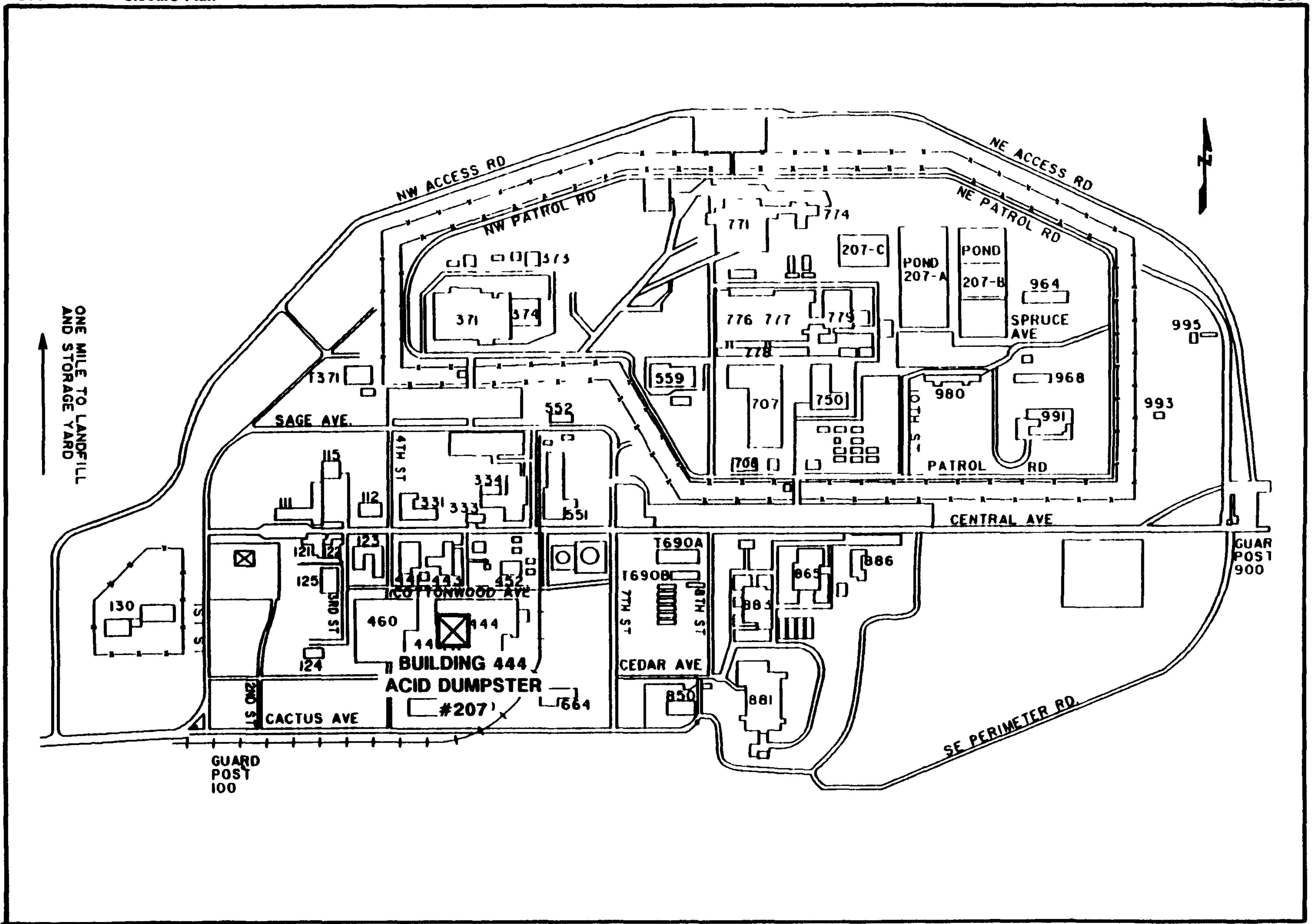


Figure 2 BUILDING 444 ACID DUMPSTER LOCATION MAP

1.3 Description of the Inactive 444 Acid Dumpsters SWMU Reference No. 207

1.3.1 Dates of Operation

Acid dumpsters for Building 444 had operated from 1980 through 1987.

1.3.2 Location and Size of Storage Area

Stainless steel dumpsters are located outside to the east of Building 444. The dumpsters are situated within a berm measuring 9'6" wide by 9' long by 1' high. Figure 3 illustrates the orientation and dimensions of the containment area.

1.3.3 Number, Types and Sizes of Containers Used

The berm has a capacity for two 500 gallon dumpsters One dumpster is filled at a time When the dumpster is full a forklift removes it and transports it to Building 374 or 774 for treatment A typical detail of the dumpsters used at Building 444 is presented in Figure 4.

1.3.4 Total Container Storage Capacity

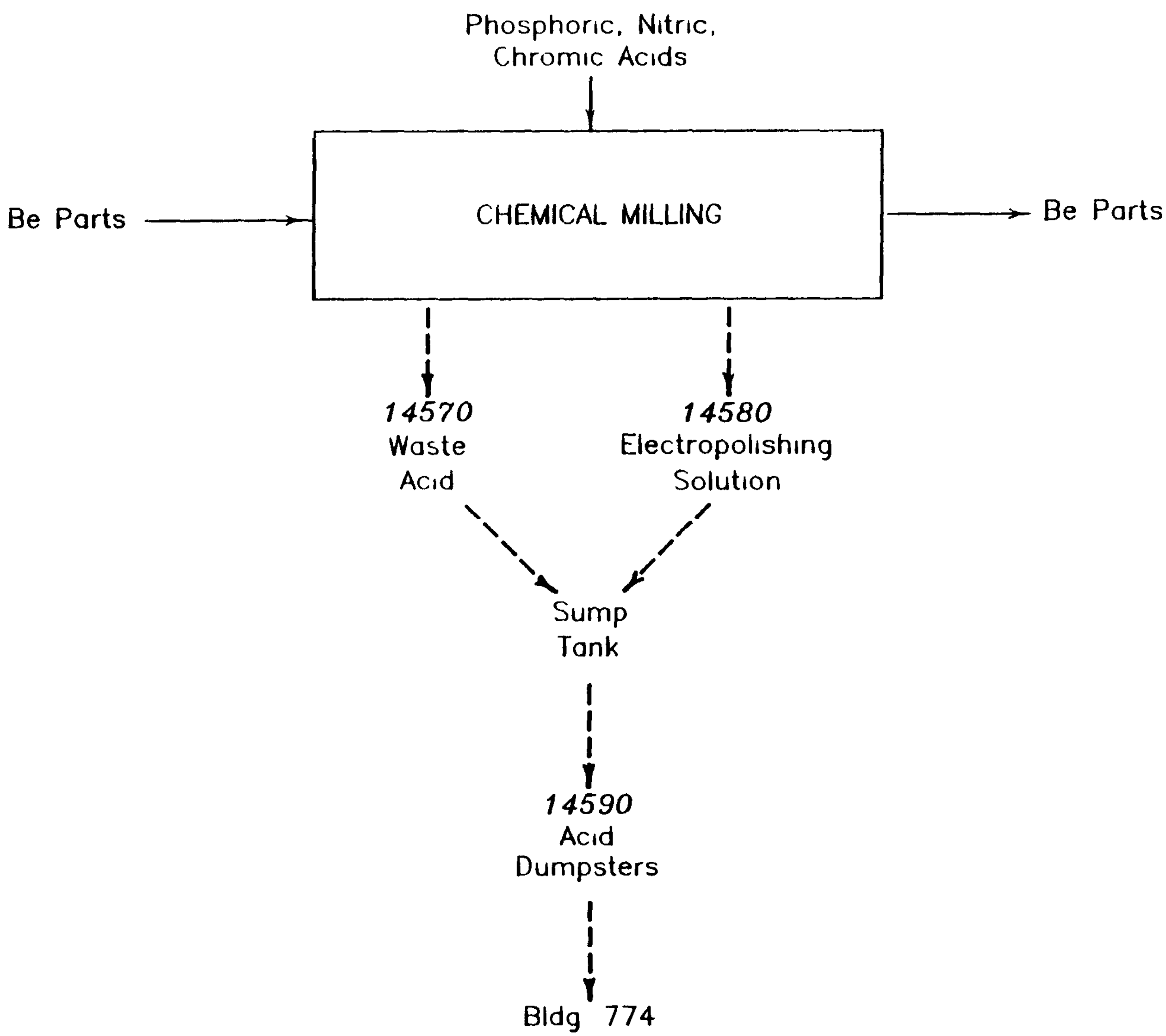
Total capacity is two 500 gallon dumpsters.

1.3.5 Monitoring and Containment System

The bermed area had been inspected on a frequent basis. No spills have been reported in this unit. The bermed area is sufficient to contain 640 gallons. This volume is in compliance with RCRA secondary containment capacity requirements of either the entire volume of the largest container (500 gallons) or 10% of the total volume in storage (100 gallons).

1.3.6 Types of Wastes Stored in the Containers

Acidic wastes from Building 444 were the waste types stored in these containers. This waste consisted of waste acid from chemical milling of beryllium, and electropolishing solution, also from chemical milling. A waste stream flow diagram for Building 444 chemical milling is presented as Figure 5 to illustrate the waste inputs to the acid dumpsters A mixture of 75% phosphoric acid, 3% sulfuric acid, and chromium trioxide was used as the raw milling acid When the acid was spent it was drained directly to the acid dumpsters located outside Building



U. S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

BLDG 444 PRODUCTION OPERATIONS
Figure 5

WESTON
SUITE 600
215 UNION BOULEVARD
LAKEWOOD COLORADO 80228

444. Analytical results for a grab sample of the acid (collected on February 12, 1987) are presented in Appendix 1.

The acid dumpsters also received waste electropolishing solution from chemical milling operations. The solution consisted of phosphoric acid. Analytical results for a grab sample of the solution (collected on February 12, 1987) are also presented in Appendix 1.

1.3.7 Existing Conditions of Area

The dumpsters and associated piping were decontaminated and moved to another process area during 1987. The berms are still intact.

1.4 Closure Plan Summary

1.4.1 Closure Plan

Closure of the acid dumpster containment area will initially involve an inspection for cracks or breaches If the cracks appear to be caused by waste acids, the asphalt paving will be removed and disposed off-site as hazardous waste In this case, it will be necessary to sample the soils or fill underneath the cracked asphalt to determine if contamination has migrated.

If the integrity of the containment area is sound, the asphalt surface will be decontaminated by a triple wash and rinse. If decontamination of the concrete is shown to be ineffective, a revised closure plan will be prepared and submitted to the Colorado Department of Health (CDH) for approval, within 90 days of making that determination. The effectiveness of concrete decontamination will be evaluated by sampling and analyzing the rinse water used to decontaminate the concrete.

1.4.2 Closure Schedule

The estimated time required for closure activities at the Building 444 Acid Dumpster facility is illustrated in Figure 6. As shown in Figure 6, the asphalt floor and berm of the Building 444 Acid Dumpster facility will be decontaminated within 60 days after closure plan approval. Analyses of the final rinse solution used in the decontamination process is anticipated to take three months and will be conducted from 60 to 150 days after closure plan approval. Assuming the asphalt is shown to be decontaminated after these activities, closure will be certified between 150 to 180 days after closure plan approval If the analysis of the final rinse solution indicates contamination is still present, the closure schedule will be extended to allow additional time for further decontamination and analysis.

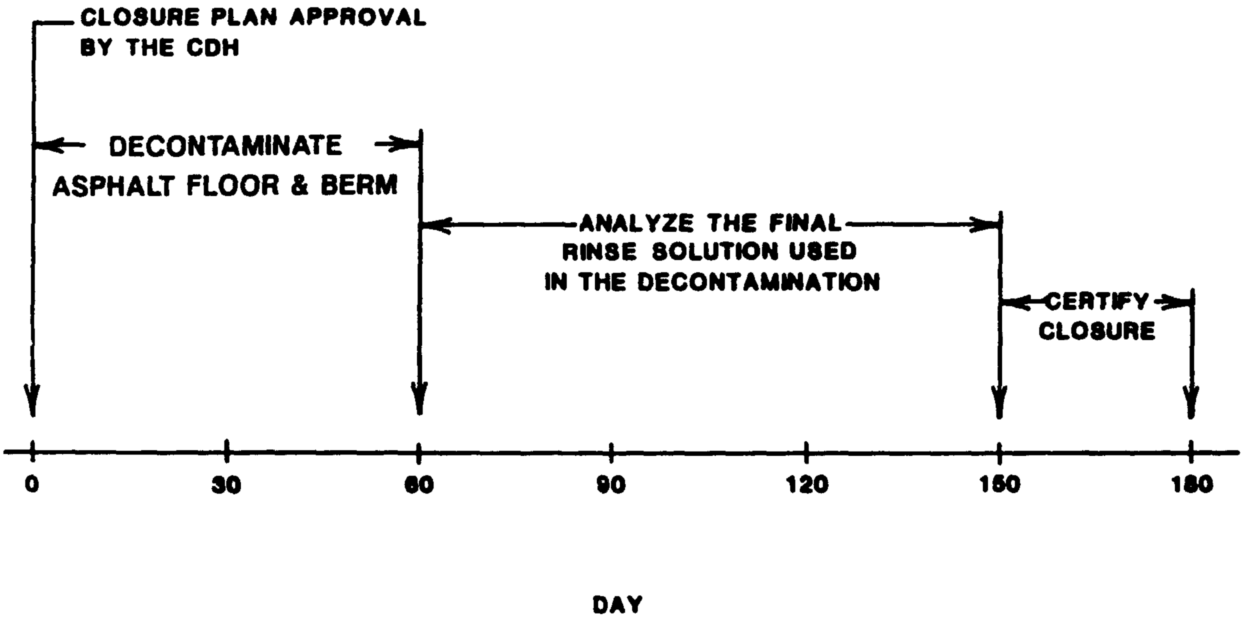


Figure 6
Schedule of Closure Activities for 444 Acid Dumpster Facility

1.4.3 Protection of Human Health and the Environment

Threats to human health and the environment are prevented by the routine monitoring activities conducted at Rocky Flats and by restricted access to the facility. Specific details of the routine monitoring program are summarized in the "Annual Environmental Monitoring Report" (Rockwell, 1987). This document is reviewed and updated on an annual basis. Brief discussions of the monitoring activities that are conducted and the security procedures at the plant are presented below.

The routine environmental monitoring program includes the sampling and analysis of airborne effluents, ambient air, surface and ground water, and soil. External penetrating gamma radiation exposures are also measured using thermoluminescent dosimeters. Samples are collected from on-site, boundary and off-site locations.

Particulate and tritium sampling of building exhaust systems is conducted continuously. For immediate detection of abnormal conditions, ventilation systems that service areas containing plutonium are equipped with Selective Alpha Air Monitors These monitors trigger an alarm automatically if out-of-tolerance conditions are experienced Particulate samples are collected from ambient air samplers operated continuously on site. The ambient air samples are analyzed for Total Long-Lived (TLL) Alpha activity or for plutonium activity. There are currently 51 of these ambient air samplers. Twenty-three are located within and adjacent to the Rocky Flats exclusion area, 14 are located along or near the plant's perimeter and 14 are located in nearby communities.

The majority of the water used at the RFP for plant process operations and sanitary purposes is treated and evaporated and/or reused for cooling tower makeup or steam plant use. The discharge of water off-site is minimized to the greatest extent possible. Water discharges from the Rocky Flats Plant are monitored for compliance with appropriate CDH standards and EPA National Pollutant Discharge Elimination System (NPDES) permit limitations. Surface runoff from precipitation is collected in surface water control ponds and discharged off site after monitoring. Routine water monitoring is conducted for two downstream reservoirs and for drinking water sources in nine communities. Ground-water monitoring was conducted during 1987 at approximately 160 ground-water sampling locations

Soil samples were collected during 1987 from 40 sites located on radii from Rocky Flats at distances of 1 6 and 3 2 kilometers (1 and 2 miles). The purpose of this soil sampling is to determine if there are any changes in plutonium concentrations in the soil around the plant.

When higher concentrations than usual are found in any of the routine monitoring activities or when out-of-compliance conditions are identified, the cause of the problem is investigated. If the Building 444 Acid Dumpster Facility is found to be the cause of an out-of-compliance condition, this closure plan will be revised within 30 days.

Access to the plant is limited by:

- a three-strand barbed wire cattle fence surrounding the facility (Figure 1) posted to identify the land as a government reservation/ restricted area,
- guards patrolling the controlled area and the PSZ 24 hours per day, and
- surveillance by security cameras 24 hours per day.

The existing fences and gates are operated and maintained by the U.S. Department of Energy.

The monitoring and security measures outlined above are designed to protect human health and the environment by threats posed by the plant as a whole. In addition, they protect human health and the environment from threats posed by the Building 444 Acid Dumpster facility.

1.5 Administration of Closure Plan

The closure plan for the container storage facilities will be kept at the Rocky Flats Area Office, Building 115, U.S. Department of Energy. The person responsible for storing and updating this copy of the closure plan is:

Mr. Albert E. Whiteman
Area Manager

His address and phone number are:

U.S. Department of Energy
Rocky Flats Plant
P.O. Box 928
Golden, Colorado 80402
Phone: (303) 966-2025

Mr. Whiteman is also responsible for updating other copies of the closure plan held off-site by sending additions or revisions by registered mail.

1.6 Closure Cost Estimates and Financial Assurance

State and Federal governments are exempt from the financial requirements imposed by Subpart H of 6 CCR 1007-3, Section 264.140(c). Because the Rocky Flats Plant is a federally-owned facility, no cost estimates or financial assurance documentation are required. However, cost estimates are presented for planning, budgeting and informational purposes.

Estimated closure costs are presented in Table 1 for two scenarios. The worst case scenario is the excavation and off-site disposal of asphalt and contaminated soil resulting from obvious breaches in containment. The volume of contaminated asphalt and soil is assumed to be approximately 12 cubic yards. This total is calculated by the dimensions of the containment area of 100 ft^2 with six inches of paving, plus contaminated soil area of 15′ x 20′ and one foot depth.

The more probable scenario is the decontamination of the containment area by triple wash and rinse. Decontamination is assumed to require 0.14 gallons of foam per square foot of concrete, and 0.28 gallons of rinse water per square foot of concrete. Waste washes and rinses would be disposed in the existing plant process waste system

CO7890010526

Date: October 3, 1988
Revision No. 1

TABLE 1

CLOSURE COST ESTIMATES
BUILDING 444 ACID DUMPSTER FACILITY

TASK	COST ESTIMATE
EXCAVATION AND OFF-SITE DISPOSAL OF 12 YD^3 OF SOIL AND ASPHALT	
Equipment, Labor	$ 1,600
Transportation and Disposal	$ 6,200
Monitoring/Planning/Restoration	$ 4,500
Certification	$ 1,000
Contingency	$ 1,500
	$ 14,800
DECONTAMINATION AND ONSITE DISPOSAL	
Equipment, Labor	$ 2,000
Analysis	$ 450
Disposal	on site
Monitoring/Planning	$ 1,000
Certification	$ 1,000
Contingency	$ 675
	$ 5,125

2.0 REMOVAL OF WASTE INVENTORY

There are and will be no containers or wastes in treatment or storage for more than 90 days at Building 444 Acid Dumpster facility during closure. Therefore, there is no inventory to be removed.

3.0 FACILITY DECONTAMINATION

3.1 Addressing Potential Soil Contamination

3.1.1 Soil Characterization

The soil sampling plan has been designed to provide an adequate data base for determining if soil removal activities are required at the Building 444 Acid Dumpster facility. If the containment area for the dumpsters is found to be compromised, soil characterization will be performed to determine residual contamination levels in soils underneath and adjacent to the containment area. The procedures used for soil characterization are presented in Appendix 2.

3.1.2 Soil Removal

3.1.2.1 Introduction

All soil removal activities must comply with a Rocky Flats Plant Operational Safety Analysis (OSA) procedure. These OSAs are required for all activities with a potential risk for serious injury, radiation exposure to personnel, or damage to property or the environment. The OSA requirement and definition are currently under review. The current draft of this requirement, RFOSA-1 (Rockwell, 1988), presented in Appendix 3, describes the procedures for removal of plutonium and/or uranium contaminated soil at the Rocky Flats Plant. If possible, the scope of RFOSA-1 will be expanded to also cover removal of soil contaminated with non-radioactive hazardous substances, as well as removal of soil contaminated with mixed waste. If this is not possible, a new OSA will be developed to govern these concerns. The approved OSA appropriate for soil removal activities at any container storage facility undergoing closure will be submitted to the CDH and U.S. EPA for review at least two months before soil removal activities begin. Given the limited time schedule for closure of container storage areas, OSAs for soil removal may be submitted to CDH and U.S. EPA prior to the determination of whether or not soil removal activities will be necessary

3.1.2.2 Removal, Packaging and Disposal

A small front end loader will be used to excavate contaminated soil. Hand excavation will be conducted in areas where the loader cannot be used due to clearance or other limitations. Following removal, contaminated soil will be packaged in either 55-gallon steel drums or boxes made of plastic-lined, triple-wall fiberboard with capacities of approximately 15 cubic feet. The containers selected for use will depend upon the requirements of the facility used for disposal. The containers will be labeled and shipped off-site for disposal. Disposal will be at an approved hazardous waste disposal facility.

The amount of area excavated at any given time will depend on the anticipated total area to be excavated. Water and/or dust palliatives will be used to control resuspension and transport by wind of contaminated soil during excavation. The need to implement dust control and the procedures selected will be based on visual observations of the work area and the results of air monitoring.

3 1 2.3 Site Restoration

Subsequent to removing contaminated soil, the excavation will be backfilled with clean soils or will be paved, depending on the amount of soil removed and the planned long-term usage of the site. Soils removed from the excavation that are clean may be reused for backfill. Clean soils from other areas of Rocky Flats may also be used. The soils will be adjusted to near optimum moisture content and placed and compacted to at least 90 percent of the maximum standard Proctor density (ASTM D-698) in landscape areas and to at least 95 percent of the maximum standard Proctor density (ASTM D-698) in paved areas.

The equipment used for compaction will be appropriate to achieve the required compaction characteristics for the types of soils being compacted. For example, a sheepsfoot compactor may be used for clay soils and a smooth-drum roller may be used for granular soils.

The surface of the backfill will be graded to the approximate elevations that existed prior to soil removal The graded surface will be finished in a manner consistent with the existing use of the area or in a manner consistent with the planned long-term use of the area.

3.1.2.4 Access Control

Access to the work area will be limited to authorized personnel only.

An area immediately outside the excavation area will be used for the first phase of equipment decontamination and for personnel decontamination. The equipment decontamination area will have tarpaulins spread over the ground and will be used to scrape or brush chunks of soil or debris off the equipment. The personnel decontamination area will be used by personnel about to leave the site for removing and discarding the disposable protective clothing. This clothing will be temporarily stored in containers prior to transport and treatment or disposal at an approved facility.

3.1.2.5 Health and Safety Plan

A site specific Health and Safety Plan, or such health and safety procedures identified in the OSA, covering contaminated soil removal will be prepared two months before soil excavation activities begin. The plan will be submitted to the Colorado Department of Health for review and will comply with all applicable requirements The procedures presented below are guidelines that will be followed during closure activities.

Additional procedures and details will be presented in the site specific Health and Safety Plan or the OSA. Worker safety guidelines, such as OSHA regulations, DOE orders and Rocky Flats Plant policies will be followed. Protective clothing will be similar in nature to:

- hardhats,
- hard-toe boots,
- Tyvek overboots,
- Tyvek suits,
- dust masks, and
- air-purifying respirators or self-contained breathing apparatus (optional).

The intent of this equipment is to provide a barrier to inhalation, ingestion and absorption of contaminated materials. Appropriate protective gloves will be used based on the contamination found at any particular site.

Air monitoring will be conducted in the work area. Portable high-volume (40 cfm) samplers or fixed radioactive ambient air samplers (25 cfm) will be located around the excavation area, including probable downwind locations.

Air monitoring will also be conducted using hand-held photoionization detectors. The site specific health and safety plan or OSA will present contaminant action levels, above which, pre-specified personnel protective equipment will be required.

A Rocky Flats Environmental Sciences representative will be monitoring conditions during excavation activities. This person will have the authority and responsibility to terminate the work is any of the following events occur

- o Wind speeds exceed 24 km/hr (15 mph).
- o Any visible dust is present or there is any indication that dust control measures were inadequate.
- o The total long-lived alpha concentrations measured on filters from high-volume samplers exceed 0.06 pCi/m^3 in order to re-evaluate dust control procedures.
- o Power failure.
- o Heavy rainfall or snow.

3.2 Areas of Facilities with Potential Asphalt or Concrete Contamination

3.2.1 Introduction

This section discusses the procedures for decontamination of areas of contaminated asphalt, or concrete Surfaces that were in contact with hazardous waste or had the potential for coming in contact with hazardous waste will be initially screened for gross radioactive contamination If the area is found to meet Rocky Flats criteria for acceptable levels of radioactive contamination, decontamination procedures will focus on the removal of hazardous waste constituents.

3.2.2 Radioactive Screening Procedures

3.2.2.1 Surveying for Alpha

Potentially contaminated surfaces will be surveyed for removable alpha contamination by performing swipe tests and counting the swipe in a scintillation-type counter instrument. To be considered clean, the surface must have removable alpha contamination less than 20 disintegrations per minute (dpm) per one hundred square centimeters.

Surfaces will also be surveyed for non-removable or fixed contamination using the air proportional-type alpha survey instrument. The direct count must be less than detectable, approximately 500 dpm per 50 square centimeters, to be considered clean.

3.2.2.2 Surveying for Beta-Gamma

The surface will be surveyed for removable beta-gamma contamination by performing swipe tests and counting the swipe in a beta-sensitive smear counter. To be considered clean, the surface must have removable beta-gamma contamination less than the activities defined in Table 2 (Rockwell, 1985).

The surface will also be surveyed for fixed beta-gamma contamination using a Ludlum Model 31, Geiger-Mueller type instrument. The instrument probe will be placed close to and moved slowly over the surface and the count-rate reading noted. The reading must be less than those defined in Table 2 (Rockwell, 1985).

3.2.3 Recommended Procedure for Decontaminating Asphalt Containment for 444 Acid Dumpsters

If cracks in the asphalt surface appear to be caused by spillage of acid, the entire berm and asphalt paving material will be excavated and loaded into roll-off boxes for off-site disposal as hazardous waste. In this case, it will be necessary to sample the soils or fill underneath the cracked asphalt to determine if contamination has migrated Soil characterization procedures similar to those presented in Appendix 2 will be implemented in

TABLE 2

ACCEPTABLE SURFACE CONTAMINATION LEVELS

(U.S. Department of Energy, 1985)

Nuclide(1)	Average(2),(3)	Maximum(2),(4)	Removable(2),(5)
U-nat, U-235, U-238, and Associated Decay Products	5,000 dpm alpha per 100 cm^2	15,000 dpm alpha per 100 cm^2	1,000 dpm alpha per 100 cm^2
Transuranics, Ra-226, Ra-288, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 dmp beta - gamma/100 cm^2	15,000 dpm beta-gamma/100 cm^2	1,000 dpm beta-gamma/100 cm^2

TABLE 2 (cont'd.)

ACCEPTABLE SURFACE CONTAMINATION LEVELS

(U.S. Department of Energy, 1985)

Notes:

(1) Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

(2) As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(3) Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

(4) The maximum contamination level applies to an area of not more than 100 cm^2.

(5) The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent level should be reduced proportionally and the entire surface should be wiped.

the case of suspected subbase or soil contamination. If cracks are not observed and the surface appears intact, the asphalt will be washed and rinsed to remove surface contamination.

The asphalt containment basin has only one layer of asphalt laid for containment purposes. Because multiple repaving has not been completed, contamination should not be present at depth. The asphalt containment basin for the 444 Acid dumpsters will be decontaminated by a triple wash and rinse. The wash will be performed using either foam or a solution of sodium carbonate and trisodium phosphate. The initial decontamination solution will be collected by wet vacuuming and drumming.

The efficiency of decontamination will be verified by analyzing rinse waters before and after use for the following indicator parameters. Parameters are selected based on the waste types generated in Building 444 chemical milling:

TYPE OF WASTE	INDICATOR PARAMETER
Acids	pH, plus sulfate, nitrate
Metals	chromium, beryllium
Radioactive	uranium
Cyanides	total cyanide

If the concentrations of the indicator parameters in the final rinse water are found at or below the minimum detectable level for analyses, the surface will be considered adequately decontaminated. If the levels are not below minimum detectable levels, the decontamination and rinse procedure will be repeated until contaminants are below detectable levels.

All cleaning solutions and rinsates will be collected and transported to Building 374 for treatment in the process waste treatment system.

4.0 DECONTAMINATION OF EQUIPMENT

4.1 Introduction

As required by 6 CCR 1007-3, Sections 265.112(b)(4) and 265.114, and 40 CFR Parts 265.112(b)(4) and 265.114, construction equipment used during removal of contaminated soil, and asphalt decontamination will be decontaminated. There is no currently identifiable auxiliary equipment associated with the Building 444 acid dumpsters. Decontamination of construction equipment will involve the procedures described in the following section

4.2 Decontamination Procedures

All construction equipment involved with removing contaminated soils will be scraped or brushed to remove chunks of soil or debris whenever the equipment leaves the excavation area. The area used for scraping or brushing will have tarpaulins spread over the ground and will be raked and/or swept to collect all removed materials The collected material will initially be handled as a hazardous waste. A representative sample of this material will be obtained and analyzed and the material will be handled appropriately based on the results of this analysis. If this waste qualifies as a hazardous waste or a mixed waste, it will be shipped off-site to an approved RCRA treatment or disposal facility or an approved mixed waste disposal facility, respectively.

At the end of all closure activities, contaminated construction equipment will be decontaminated in the Building 889 decontamination facility. This facility is currently equipped to decontaminate up to moderately sized construction equipment. Plans are to enlarge the facility by January 1989 to accommodate large construction equipment.

The anticipated decontamination system is expected to heat water to approximately 350^{o}F at 250 psig pressure. The super-heated, high-pressure stream will be sprayed on the contaminated surface through a series of nozzles incorporated into the vacuum/spray cleaning head. The exact equipment used for decontamination will vary depending on procurement of capital equipment. The equipment used will provide for adequate decontamination of the construction equipment. Rinse water from the facility will be collected in a series of underdrains and transferred to Building 374 for process waste treatment.

4.3 Ancillary Equipment

No ancillary equipment is associated with the Building 444 Acid Dumpsters facility.

5.0 GROUND WATER

5.1 Summary of Applicable Requirements

Ground-water contamination at the Rocky Flats Plant is currently the subject of ongoing investigations being performed pursuant to the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the U.S. DOE Comprehensive Environmental Assessment and Response Program (CEARP). Ground water contamination is not expected as a result of hazardous waste activities associated with the Building 444 Acid Dumpsters.

Post-closure ground-water monitoring will not be performed for the Building 444 Acid Dumpster facility because the closure performance standards outlined within this plan specify the total removal and "clean closure" of hazardous wastes and waste residues. If, during performance of closure activities, it is determined that clean closure cannot be implemented, this closure plan and a post-closure care plan will be modified to address ground-water monitoring.

6.0 SITE SECURITY

The existing security measures at the Rocky Flats plant include

- a three-strand barbed wire cattle fence surrounding the facility (Figure 1) posted to identify the land as a government reservation/restricted area,

- a fence surrounding and guards posted 24 hours per day at two gates to the controlled area of the facility (Figure 1),

- a 6-foot high chain link fence topped by 2 feet of three-strand barbed wire surrounding and guards posted 24 hours per day at gates to the perimeter security zone (PSZ),

- guards patrolling the controlled area and the PSZ 24 hours per day, and

- surveillance by security cameras 24 hours per day.

The existing security measures are sufficient to meet the requirements of 6 CCR 1007-3, Section 265.14 and 40 CFR Part 265.14.

7.0 CLOSURE CERTIFICATION

7.1 Certification Requirements

Certification of closure requirements is outlined in 6 CCR 1007-3, Section 265.115 and 40 CFR 265.115:

> "When closure is completed, the owner or operator must submit to the (Department of Health/Regional Administrator) certification both by the owner or operator and by an independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan."

Certification by a registered professional engineer does not guarantee the adequacy of the closure procedures and does not necessarily involve detailed testing and analyses. It implies that, based on periodic facility inspections, closure has been completed in accordance with the specifications in the approved closure plan (U.S. Environmental Protection Agency, 1981).

7.2 Activities Requiring Inspections by a Registered Professional Engineer

An independent registered professional engineer will inspect asphalt decontamination activities for certification of closure Soil sampling activities will not be observed by the engineer certifying closure. However, field personnel will keep and sign detailed field records of soil sampling activities. The field records and the results of soil analyses will be reviewed by the engineer certifying closure.

7.3 Anticipated Schedule of Inspections by a Registered Professional Engineer

An independent registered engineer will periodically review the closure operations listed in Section 7.2 in order that a final certification of closure can be developed which states that the closure has been carried out according to the plan. The engineer will periodically obtain and review the results of chemical testing which provide a record of the progress and effectiveness of the implemented closure plan.

The independent engineer and the owner will, at the end of closure, inspect the site and certify that the closure plan was carried out as described. Prior to final certification, deficiencies noted by the engineer will be corrected When deficiencies have been corrected, the engineer will issue a written report to the regulatory agencies certifying that the facility has been closed according to this closure document

REFERENCES

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U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Third Edition, SW-846, November 1986, Office of Solid Waste and Emergency Response

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APPENDIX 1

ANALYTICAL RESULTS FOR WASTE INPUTS TO BUILDING 444 ACID DUMPSTERS

Waste 14570 WASTE ACID

Building 444 PRODUCTION OPERATIONS
Process 3 CHEMICAL MILLING

Reg. Class . HAZARDOUS

Type AQUEOUS
Quantity 10 gal/yr
Gen. Freq. . INFREQUENT
Pretreatment: NONE

Transport : TRUCKING
Storage : ACID DUMPSTER
Next Dest. : COMPOSITE WASTE 14590
Final Disp. : BLDG. 774

Description:

A mixture of 75% phosphoric acid, 3% sulfuric acid, and chromium trioxide is used to chemically mill beryllium parts. When the bath needs changing, it is drained into a small free-standing metal sump tank, and is pumped to the acid dumpsters outside bldg. 444.

SWMU Association: No SWMU identified for this waste stream.

Sampling Report:

SAMPLE NO	SAMPLE DATE	SAMPLE METHOD	ANALYSIS REQUESTED	SAMPLING LOCATION
14570	02/12/87	dipper	Spec. Cond, Corrosivity, EP Tox Metals, Radio Chemistry	chem milling

Waste Stream Identification
Rocky Flats Plant
April 6, 1987

Sample No. 14570
Building 444 Waste No 14570
Date Sampled 02/12/87 Description WASTE ACID

Inorganic Batch No. EP20

Ignitability. Not requested.

Corrosivity: (D002) * * EXCEEDS LIMIT * * [pH=<2.0]

Reactivity: Not requested.

EP Tox Metals:	Cadmium (D006) ...	7.49	mg/L	* * * EXCEEDS LIMIT * * *
	Chromium (D007) ..	92700	mg/L	* * * EXCEEDS LIMIT * * *
	Lead (D008)	71.9	mg/L	* * * EXCEEDS LIMIT * * *
	Silver (D011)	16.9	mg/L	* * * EXCEEDS LIMIT * * *

Volatile Not requested.

Semi-Volatile: Not requested.

Pesticides/PCB's: Not requested.

HSL Metals. Not requested.

Radiochemistry: Batch No. 23638-8-3

Am-241........	-0.06	+/-	0.40	pCi/L
U-233,234.....	14	+/-	18	pCi/L
U-238.........	51	+/-	43	pCi/L
Tritium.......	-0.02	+/-	0.25	pCi/ml

Waste Stream Identification
Rocky Flats Plant
April 6, 1987

Waste 14580 ELECTROPOLISHING SOLUTION

Building 444 PRODUCTION OPERATIONS
Process 3 CHEMICAL MILLING

Reg. Class . MIXED RADIOACTIVE*

Type	. AQUEOUS	Transport	· TRUCKING
Quantity	10	Storage	: ACID DUMPSTER
Gen. Freq.	: INFREQUENT	Next Dest.	: COMPOSITE WASTE 14590
Pretreatment:	NONE	Final Disp.	: BLDG. 774

* indicates classification is based primarily upon process knowledge.

Description:

After chemical milling, parts are placed in the electropolishing tanks, which contain phosphoric acid. These tanks are drained to drums, which are pumped into the sump next to the chemical milling tank. From there, the waste is pumped to the acid dumpsters.

SWMU Association: No SWMU identified for this waste stream.

Sampling Report:

SAMPLE NO	SAMPLE DATE	SAMPLE METHOD	ANALYSIS REQUESTED	SAMPLING LOCATION
14580	02/12/87	dipper	Spec. Cond, Corrosivity, Reactivity, EP Tox Metals, Radio Chemistry	chem milling

Sample No. 14580
Building 444 Waste No. 14580
Date Sampled 02/12/87 Description ELECTROPOLISHING SOLUTION

Inorganic. Batch No. EP20

Ignitability Not requested.

Corrosivity (D002) * * EXCEEDS LIMIT * * [pH=<2.0]

Reactivity: (D003).. Cyanide: 2800 ug/g
Sulfide: <1.0 ug/g

EP Tox Metals.	Arsenic (D004) ...	153	mg/L	* * * EXCEEDS LIMIT * * *
	Cadmium (D006) ...	1.90	mg/L	* * * EXCEEDS LIMIT * * *
	Chromium (D007) ..	85.0	mg/L	* * * EXCEEDS LIMIT * * *
	Lead (D008)	406	mg/L	* * * EXCEEDS LIMIT * * *
	Selenium (D010) ..	0.27	mg/L	

Volatile Not requested.

Semi-Volatile. Not requested.

Pesticides/PCB's Not requested.

HSL Metals: Not requested.

Radiochemistry Batch No. 23638-8-4

Am-241........	3.3	+/-	2.5	pCi/L
Tritium.......	0.11	+/-	0.22	pCi/ml

APPENDIX 2

SOIL CHARACTERIZATION PROCEDURES

CLOSURE PLAN

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SECTION I CLOSURE PLAN

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TABLES

I-1 INTRODUCTION

This appendix provides details on methods and activities associated with soil sampling in areas potentially contaminated by hazardous or mixed wastes at the Rocky Flats Plant. Decision criteria will also be presented for determining the level and areal extent of contamination at any area found to be contaminated. Criteria will also be presented for whether the area will undergo closure treatment of the contaminated soil, or leaving contamination in-place necessitating Post Closure Care and Post-Closure Care monitoring.

I-1a General Considerations

Before commencing decontamination of a facility, consideration must be given to the disposal of the wastes which will be produced. This includes an assessment of the types and quantities of wastes, safety aspects, handling, treatment and final disposal options. The waste volumes should be minimized as far as possible and the compatibility of wastes must be considered.

Categories of waste generated during decontamination may include:

- o Cleaning materials; for example,paper towels and swabs
- o Protective clothing and materials, for example, polyethylene sheeting, overalls, boots, and gloves
- o Organic solvents
- o Aqueous liquids, for example:
    - i. detergents and soapy wastes

ii. acid solutions, possibly with appreciable salt and

iii. solution containing complexing agents.

- Solids, for example:

  i. scrap structural materials

  ii. spent abrasive materials

  iii. accumulated corrosion products

  iv. spent ion-exchange materials

  v. used ventilation filters and other temporary enclosure equipment

  vi. contaminated soil.

I-1b Soil Decontamination Procedures

For contaminated soils at Rocky Flats, the typical decontamination procedure will be excavation and offsite disposal and treatment. This method of decontamination is preferred due to the limited volume of contaminated material expected in areas undergoing RCRA closure. Inactive Solid Waste Management Units (SWMU's) as defined by RCRA 3004(u) are being investigated either as a part of the Post-Closure Care Permit or as a part of the Comprehensive Environmental Assessment and Response Program (CEARP) which is under way at the Rocky Flats Plant CEARP is essentially a DOE equivalent to CERCLA, but it includes and addresses environmental laws and regulations not covered by CERCLA.

Large areas of contaminated soil (areas that would require more than \$1 x 10^6 for excavation and offsite disposal) may be considered for treatment, containment, and monitoring closure and post-closure care. A listing of possible treatment, capping, and containment methods is presented in the CEARP Phase 2a Documents (Feasibility Studies) of February 16, 1987. Additional treatment and containment methods may be developed in the future and will be considered in the above evaluations.

The following principles apply to soil excavation activities:

- Wherever decontamination is carried out, all efforts must be made to "contain" the contamination. This principle is particularly important when decontamination is carried on "in situ." Containment may involve the use of temporary structures or other artifacts.
- More highly contaminated areas should be decontaminated first.
- Methods should be chosen that will minimize the decontamination wastes consistent with the decontamination process.

I-2 DETERMINATION OF AREAS OF CONTAMINATED SOIL

I-2a Sampling of Background Soil

Soil sampling of uncontaminated soil in the Rocky Flats Plant western buffer zone, for purposes of the west spray field sampling, have been conducted The soil samples analyzed were taken from the surface, zero to six inches and six to twelve inches. Due to the limited background soil sampling done to date, these analyses may not adequately represent background soil characteristics These preliminary results on background soil will be supplemented this year and may be supplemented in the future with some additional analyses.

Additional analyses and characterization of background soils at the Rocky Flats Plant will be conducted in 1987. These soil samples will be taken from two 400 x 400 foot plots. These plots will be approximately 5,500 feet south and 1,300 feet west of Pond 207-A on the south-facing slope leading down to the southern tributary of Woman Creek. The second 400 x 400 foot plot will be located approximately 3,500 feet north and 2,500 feet east of the center of Pond 207-A.

Two deep borings will be located within each grid and will be extended approximately three to five feet into unweathered bedrock or the water table, whichever is shallower. Soil samples designated for chemical analysis will be placed in pre-washed jars, labeled and stored on ice for analysis. Samples of the surficial materials, weathered bedrock, and unweathered bedrock will be obtained from each boring for laboratory analyses. Samples for analysis will be collected at a maximum of five foot intervals. A minimum of one sample will be collected from every lithology present. These samples will be used to develop background concentrations for the soils at depth

Eighteen locations on the 400-foot by 400-foot grid will also be randomly selected for surficial soil sampling. At the eighteen locations, samples will be collected as a surface scrape, a six to twelve inch composite, an 18 to 24 inch composite, and a 54 to 60 inch composite, in addition to three equally spaced depths between the ground surface and bedrock. For each characterization plot, the eighteen locations will be randomly divided into six groups. Six composites of three samples each will be made at each depth, i.e., the eighteen samples at the highest depth will be composited into six samples. The laboratory results will be analyzed statistically to determine the background means, standard deviation, and whether the data is normally distributed. These results will be used for comparison with potentially contaminated soils.

It is currently assumed that background soil data for indicator parameters will be normally distributed. If these data are not normally distributed, then the data will be transformed in order to develop statistically valid means and standard deviations. A non-parametric test, such as a Kolomogorov-Smirnov for normality test, may be used to determine whether the background soil data is normally distributed.

The background samples selected for laboratory analyses will be analyzed for the parameters listed in Table 1 Additionally, one sample from every lithology in each boring will be analyzed for pH, organic carbon content and cation exchange capacity and possibly oxidation redox potential. Evaluation for pH will be conducted with pH paper in the field.

BACKGROUND SOIL SAMPLING PARAMETERS

TABLE 1

Metals

Hazardous Substances List - Metals
Cesium
Molybdenum
Strontium
Lithium
Beryllium
Chromium (Hexavalent)

Anions

Cyanide
Nitrate
Sulfate

Radionuclides

Gross Alpha
Gross Beta
Uranium 233, 234 and 238
Americium 241
Plutonium 239
Strontium 90
Cesium 137
Tritium

Organics

Hazardous Substance List - Volatiles
Hazardous Substance List - Semi-Volatiles

Other

EP Toxicity
Characteristics (e.g. ignitability, corrosivity, reactivity)

I-2b Sampling of Background Soil

I-2b(1) Screening

The objective of soil sampling in all areas is to determine whether any contamination exists and to determine the extent and concentration of contaminants if contamination does exist.

Potentially contaminated soil is that soil for which a reasonable probability exists that contamination is present. These are areas in which spills or leaks may have occurred prior to November 1986, or in which spills or leaks of less than a Reportable Quantity or other spills or leaks have occurred after November 1986. These areas will include outdoor areas of soil over which storage of hazardous waste took place without secondary containment In addition, soil in areas that may have been affected by precipitation run-off originating from an area of non-secondarily contained outside hazardous waste storage will also be sampled. Secondarily contained units, either storage, treatment, or transfer, will not be sampled for soil contamination unless the secondary containment for the unit has been compromised. The following criteria determine whether the secondary containment of a unit has been compromised:

- Spills or leaks have occurred to soil outside the secondary containment
- A hole, fracture, crack, or significant corrosion has been identified in the secondary containment of a unit, and leaks or spills have occurred near these areas of the unit.
- Secondary containment has been overtopped by a leak or spill resulting in soil contamination.

- o Concrete secondary containment for a unit in which spills or leaks have occurred will be considered compromised, if the lower four inches of concrete underlying the area of leaks or spills has indicator parameters in concentrations greater than the mean plus three standard deviations of the indicator parameters in uncontaminated concrete samples. Samples of potentially contaminated concrete may be taken by coring, cutting or breaking the concrete.

However, these criteria apply only to areas in which secondary containment for the unit has always been present. Units to which secondary containment was added after operation of the unit for hazardous waste management began may require soil sampling.

Indicator parameters will be chosen for soil sampling near any particular unit based upon the wastes managed at that facility. Indicator parameters for various hazardous waste types are presented in Table 2 and will preliminarily be selected prior to initiation of site screening. A screening of the site will be conducted prior to soil sampling to ensure the safety of the workers and to indicate whether additional indicator parameters are required.

INDICATOR PARAMETERS

TABLE 2

TYPE OF WASTE	INDICATOR PARAMETER
ACIDS	pH PLUS APPROPRIATE ANION
METALS	APPROPRIATE METALLIC CATION
CYANIDES	CYANIDE
SOLVENTS	APPROPRIATE SOLVENT, TOTAL ORGANIC HALOGENS
OIL	TOTAL ORGANIC CARBON TOTAL ORGANIC HALOGENS
CAUSTICS	pH PLUS APPROPRIATE CATION
RADIOACTIVE	SPECIFIC RADIONUCLIDE ISOTOPES

A screening of the site will include the following assessment:

- o visual survey
- o radiation survey
- o photoionization detection survey or equivalent

Visual Survey

The visual survey will be conducted to identify areas that are potentially contaminated. These areas can be identified by the presence of soil discoloration, the presence of waste materials on the soils, or debris present on the soil.

Direct Alpha Survey

The direct alpha survey will be conducted over the ground surface to detect above background levels of radioactivity. The assessment will be conducted in accordance with Rocky Flats' radiation monitoring procedures. The following parameters may be included in the radiological assessment:

- o Gross alpha,
- o Gross beta, and
- o Gamma.

Photoionization Detection Survey

The photoionization detection survey or an equivalent method will be conducted to determine the presence of volatile organics in ambient air above the potentially contaminated area

The visual survey, the radiological survey and the photoionization detection survey will be evaluated prior to collection of any soil samples The preliminary list of indicator parameters will be reviewed for the site based upon the above screening activities, and revised if necessary. Soil sampling point locations will then be chosen.

I-2b(2) Sampling Point Identification

A typical area to be investigated at Rocky Flats will include five sampling locations that are sampled at various depths. These locations will be separately sampled and analyzed; no compositing of samples taken at the various sampling locations will be conducted. This number of samples, based upon a 1983 EPA document (Reference: USEPA. "Preparation of Soil Sampling Protocol: Technique and Strategies," U.S. Environmental Protection Agency, EPA-600/4-83-020, 1983) will provide approximately a 90% confidence level of finding any contamination present in the soil. The 90% confidence level is derived from the variance in lead concentrations detected by laboratory analyses in six soil samples collected within the Buffer Zone and the West Spray Field. The 90% confidence level calculation assumes a normal distribution of data and a two-tailed t statistic (see Table 3) As previously explained, soil samples taken to date may not be entirely representative of background soils, but additional analyses will be conducted on background soils and the statistical confidence level of identifying any contamination at a site will be stated in the Closure Plan documentation submitted to the regulators.

SOIL SAMPLING STATISTICS

TABLE 3

Reference: USEPA. "Preparation of Soil Sampling Protocol: Technique and Strategies," U S Environmental Protection Agency, EPA-600/4-83-020, 1983. Page 25 :

$$n = \frac{CV^2 \, t^2}{p^2} \quad \text{Where}$$

n = # of samples to be taken

$$CV = \text{Coefficient of Variance} = \frac{\text{Std. Dev.}}{\text{mean}} \times 100\%$$

t = t statistic at given confidence level with n-1 degrees of freedom
p = D/y x 100% = measure of precision of results
D = Precision of analytical results (typically ± 10 ppm as per USEPA)
y = Mean of contaminant from soil samples taken to date

For lead concentrations in Buffer Zone and West Spray Field surface scrape soil samples:

Pb (mg/kg): 38, 48, 42, 61, 63, 42
y = 49
S = Standard Deviation = 10.58

$$CV = \frac{10.58}{49} \times 100\% = 21.592\%$$

D/y = 10/49 x 100% = 20.41%
t for n-1= 5 at 90% confidence level(two-tailed)=2.015

$$n = \frac{(21.592)^2 \, (2.015 \; 2)^2}{(20 \; 41)^2} = 4 \; 54 \text{ samples}$$

Therefore, five samples per area of investigation will provide a valid statistical database, assuming that the data distribution for lead is the same as for all indicator parameters, that the data for all indicator parameters is normally distributed and is represented by a two-tailed t statistic

The location strategy for the five samples per investigation site will include both target and random sampling The allocation of sampling locations will first go to target locations at which contamination is suspected. For instance, if a specific area of the investigation site has discolored soil, higher than background levels of radiation or volatile organics as detected in the initial visual, radiological or photoionization surveys, the area will be targeted for sampling. In addition, target samples will be taken on the basis of historical operations data, such as known spill areas. If less than five target samples are taken at an investigation site, random samples will be taken to increase the total number of samples analyzed to five.

To locate the random samples, a rectangular grid will be superimposed on a map of the investigation site. The grid will extend five feet beyond the expected area of contamination, and will contain ten times the number of sampling locations (nodes) required, to provide a total of five target and random samples. For example, if two random samples are required the rectangular grid will contain twenty nodes. Each side of the rectangle will have the same number of nodes, but the distance between nodes may vary based on the dimensions of the rectangle The nodes should be numbered and sampling locations chosen randomly, using a random number generator or equivalent device Any nodes randomly chosen that are identical to a target sampling location will be excluded from sampling and another sampling location chosen. All sampling locations should be within the area of potential soil contamination plus five feet.

Most areas currently identified for soil sampling related to closure activities are areas at which contamination is expected at the surface of the soil, or areas immediately underlying concrete or other containment structures At identified soil sampling locations, soil samples will be taken as a surface scrape, a six to twelve inch composite, and an eighteen to twenty one inch composite. These samples may be taken by hand-bucket augers, by drill rigs, or by hand implements. Methods of soil sample collection will vary depending on the area and soil conditions Typically, samples will be collected by a hand method. Drilling methods and procedures that may be used are presented in the CEARP Phase 2a Documents, February 16, 1987

If collection of soil samples at depth is required, such as where a buried process waste line leaked, then the sampling depths must be altered as follows. If the suspected contamination area is buried and has not been excavated for removal, then samples should be taken at the depth of the potential waste source, three feet above the potential waste source, and three feet below the potential waste source If the suspected contamination has been excavated, such as for line removal or repair, then the samples may be taken from the trench or pit in approximately the areas identified above. These samples may be collected from the sides or the bottom of the trench or pit Five sampling locations (fifteen total samples for laboratory analysis) should be identified in each such area. These locations should generally be placed along the piping route due to the preferential migration of wastes in the sand backfill present in the pipe bedding, or present in the area excavated for the foundations Individual site conditions can overrule this general guide for placement of boring locations

Field records of all sampling activities will be made, noting field conditions and color, texture, odor, or other items of interest concerning the site and soil. A soil sample will be immediately placed in pre-washed sample jars as appropriate for the analyses to be conducted. These jars will then be tightly capped, labeled, and placed on ice until delivered to the laboratory A chain-of-custody record will be maintained on all samples. After sampling any soil, the sampling equipment and aluminum trays will be thoroughly decontaminated. These items will be scrubbed with a tap water and detergent solution, rinsed with tap water, rinsed with acetone, rinsed with distilled water, and allowed to air dry. Mixing trowels will also be decontaminated after each soil sampling location has been sampled. Required sampling equipment is given in Table 4 Samples will be analyzed for total concentrations of applicable indicator parameters

SOIL SAMPLING EQUIPMENT

TABLE 4

Analytical Request Form
Chain of Custody Forms
Logbook/ink pens
Watch
Sample containers/labels
Hand auger
Split spoon sampler
Sledgehammer
Polyethylene sheeting
Paper towels
Shovels or trowels
Plastic or metal scoops
HPLC/ distilled water
Hand spade
Aluminum pans for temporary sample placement and depth compositing
Neoprene gloves
Coolers with ice
Camera
Tape measure - 250'
Stakes
Survey tape

<u>Sample/Equipment Decontamination</u>
Wash bucket
Rinse bucket
Alkaline detergent
Brushes
Paper towels/plastic trash bags
Acetone
Tap water
Distilled water

I-2c Analysis of Data

The analysis of soil data will be based on a statistically valid procedure, comparing concentrations of indicator parameters in background soil to concentrations of indicator parameters in the potentially contaminated soil If no areas of elevated indicator parameter concentrations in the potentially contaminated area are identified, then the area will be considered clean and closure certified

An elevated concentration of an indicator parameter is defined as a mean value greater than the mean of the background soils based on a t-test and a 95% confidence level. Any single sample of potentially contaminated soil greater than the mean of the background soils plus three standard deviations will also be considered contaminated. The above criteria apply to metals Detectable quantities of volatile or semi-volatile organic compounds in the potentially contaminated soil will also be considered elevated. An exception to this rule is pH, because high or low pH may indicate contamination. For pH, a contaminated value is defined as a value outside the mean background pH plus or minus three standard deviations. It is currently assumed that background soil data for indicator parameters will be normally distributed If the data are not normally distributed, then the data will be transformed in order to develop statistically valid means and standard deviations A non-parametric test, such as the Kolmogorov-Smirnov test for normality, may be used to determine if the background soil data is normally distributed

If areas of soil contamination are identified by the previous methods, then further soil analyses may be required to define the full extent of contamination. If contaminated samples have uncontaminated soils identified in all directions (both vertically and horizontally) around the samples, then linear interpolation between points can be used to determine the approximate extent of contamination.

If uncontaminated soil is not identified in all directions around a contaminated area, then additional soil samples will be taken at approximately one yard intervals and analyzed until uncontaminated soil has been identified in all directions around contaminated soil areas Linear interpolation can be used between contaminated and uncontaminated soil sampling points to determine the approximate locations at which uncontaminated soil may be found This guideline of one yard may be modified to greater or smaller distances depending on the history and operation of the particular unit.

I-2d Decontamination or Post-Closure Care

As previously explained, excavation and offsite disposal or treatment of contaminated soil, along with certification of clean closure of the unit, is the preferred method of decontamination. However, when the cost of excavation and offsite disposal exceeds $\$1 \times 10^6$, then treatment, containment, and monitoring closure alternatives may be considered These alternatives will include Post-Closure Care and monitoring unless the contaminated soil is entirely excavated for disposal, or excavated for treatment to background levels Post-Closure Care and monitoring must extend for a minimum of thirty years, and will require a minimum of one upgradient and three downgradient groundwater monitoring wells. The cost of Post-Closure Care and monitoring is significant, and must be assessed when deciding which option to pursue Requirements for Post-Closure Care are outlined in the Rocky Flats Hazardous and mixed waste requirements manual, as well as in the Rocky Flats Plant Post-Closure Care Permit The Post-Closure Care Permit must be modified to reflect any new units requiring Post-Closure Care.

The evaluation of treatment, containment and monitoring options will be similar to the procedures followed for feasibility studies under the CEARP Program, but the submitted documentation will be considerably shortened and cost will be the primary consideration for option selection. An outline for the implementation of feasibility studies, along with current treatment and containment options are presented in the CEARP Phase IIa Documents of February 16, 1987

Whenever excavation and offsite disposal of contaminated soil is conducted, verifying soil samples must be collected These soil samples will be collected from approximately the middle of horizontal edges of the excavation, and from approximately the center of the bottom of the excavation A minimum of five samples will be collected These samples will be collected as previously outlined, and will be analyzed for the indicator parameters appropriate for that unit. If these samples are uncontaminated then clean closure can be certified. If these samples are found to be contaminated, then the maximum extent of contamination must be identified as outlined in Section I-1c and I-2c of this Appendix. In the latter case verifying soil samples must again be taken when all contaminated soil is thought to be removed

APPENDIX 3

OPERATIONAL SAFETY ANALYSIS (OSA)
FOR SOIL REMOVAL

(Rockwell, 1988)

DRAFT

OPERATIONAL SAFETY ANALYSIS [OSA]

SCOPE

An OSA is required for the operations defined in this document. OSAs establish safe practices and shall be thoughtfully prepared, and thoroughly reviewed with the identified controls carefully implemented. OSAs will be reviewed at least annually.

1 GENERAL RESPONSIBILITIES

1 1 The Responsible User/Supervisor will

1 1 1 Assess the operations for which he/she is responsible and prepare an OSA, if required

1 1 2 Ensure the submission is complete, and follow the OSA through the entire safety review procedure

1 1 3 Secure the necessary review and approvals BEFORE initiating new operations or changes

1 1 4 Implement the OSA and all identified requirements

1 1 5 Incorporate all safety requirements specified in the OSA into the appropriate operating procedure

1 1 6 Instruct involved employees on prescribed operating procedures and emergency procedures

1 1.7 Notify the HS&E Area Engineer of any change in the operations and secure a safety review prior to implementing any change[s]

1.2 The HS&E Area Engineer is available to assist Responsible Users/ supervisors identify operations which require OSAs and to prepare new OSAs The HS&E Area Engineer will determine, with input from Safety Analysis, if the OSA should include a Failure Mode Effects Analysis [FMEA] The HS&E Area Engineer will review the OSA for compliance with established codes, standards, regulations, Rocky Flats Plant practices, and will conduct periodic reviews OSAs will be audited during the annual Multi-Discipline Audit.

1 3 The Director of Health, Safety and Environment, will indicate his review and concurrence by signing the OSA Title and Approval Sheet [see Appendix B].

1.4 The Approval Authority [Director] will be satisfied that the proposed operation may be conducted safely, and will formally authorize the conduct of the operation [see Appendix A].

1 5 Each employee participating in the operation is responsible to perform work in accordance with the requirements of the OSA

2 WHEN REQUIRED

2 1 This review process is MANDATORY for every Rocky Flats Plant [RFP] operation with a potential risk for serious injury, radiation exposure to personnel, or damage to property or the environment The HS&E Area Engineer will assist in the determination of the need for an OSA during the review process based on the following criteria

2 1 1 Operations with a potential for exposing employees to radioactive or toxic materials in excess of established guides/limits

2 1 2 Unless specifically exempted by the Director of HS&E, any operation which involves a radioactive source subject to registry per HSE 18 04, Section 5 1

2 1 3 Any work with Occupational Safety and Health Administration or Department of Energy [DOE] defined carcinogens

2 1 4 Operation of accelerators, x-ray machines, radiography sources, lasers, and microwave generators [other than food preparation machines]

2 1 5 Pneumatic systems with high stored energy potential, such as

2.1.5 1 Units 6 inches and under in diameter - 100psig or greater
Units over 6 inches and up to 24 inches in diameter - 15 psig or greater
Units over 24 inches in diameter - 5 psig or greater.

2.1.5.2 Hydraulic pressures greater than 10,000 psig

2.1 5.3 High voltage greater than 20 kilovolt [kV] in a vacuum

2 1.5.4 Greater than 25 joules [J] of stored electrical energy in capacitors and capacitor banks.

2.1.6 Any work with materials having a health hazard rating of FOUR in the Hazardous Material Handbook

2 1.7 Work with explosives

2 1.8 The use and storage of firearms and ammunition

2.1.9 Operations with potential for exposing employees to environmental conditions in excess of established guides or limits [i e , noise, heat, etc]

2 1 10 Any work involving flammable liquids as defined in HSE Manual Procedure 9 05, "Handling and Storage of Flammable Liquids for Fire Safety," Section 1 1

2.1 11 Any operation identified as hazardous by the HSE Area Engineer, or by any HS&E discipline

3 PROCEDURE FOR DEVELOPING AN OSA

3 1 Responsible User/Supervisor and HS&E Area Engineer Determine the need for, and scope of each OSA If an OSA is to be written, discuss details and depth that the OSA must contain

3 2 Responsible User/Supervisor Write the OSA using Title and Approval Authority Sheet [Appendix B], and Procedure Sheet [Appendix C] of this Procedure The OSA should identify basic operations potential hazards, and hazard controls

All required Failure Mode & Effects Analyses [FMEAs] shall be incorporated as an addendum to the OSA

Send completed OSA to the appropriate HS&E Area Engineer for review.

3.3 HS&E Area Engineer: Review the OSA, log in, and assign OSA number Send copies of the OSA, with Comment Review Sheet [Appendix D] to the Area Safety Team members, along with information indicating the time and place of the HS&E review meeting. Schedule a meeting approximately 5 working days from the submittal of the OSA to the Area Safety Team.

3.4 HS&E Area Engineer and Area Safety Team: Review the OSA and the operation, with the Responsible User/Supervisor at the SITE OF THE OPERATION. Consider all hazards and ensure the hazard controls are adequate. Recommend the OSA be reviewed by a technical specialist, if appropriate, and attend the HS&E review. ALL comments must be signed and will remain as a permanent part of the OSA.

3.5 Responsible User/Supervisor

3.5.1 Re-write the OSA incorporating all comments from the HS&E review.

3.5.2 Return the OSA to the HS&E Area Engineer, along with all comments for review.

3.6 HS&E Area Engineer Review the OSA and ensure all comments are present.

NOTE: If a problem arises that cannot be resolved, the OSA will be routed to the Director of Health, Safety and Environment for final resolution

Write a cover letter to the Approval Authority highlighting areas of the OSA requiring maximum attention during implementation and use of the OSA Send the cover letter and OSA with all comments to the Director, HS&E [alternate, Manager, HSE Area Management] for review and concurrence

3.7 Provide the OSA title, number, Responsible User, method of information dissemination, and Approval Authority to the HSE Area Management Office

3.8 Director of Health, Safety and Environment Review, concur, and sign the original Title and Approval Sheet Forward OSA package to the appropriate Approval Authority

3.9 Approval Authority When the approval is granted, sign original Title and Approval Authority Sheet [Appendix B] and return to the appropriate HS&E Area Engineer If the OSA is NOT approved, return it to the Responsible User/Supervisor for necessary changes and notify the HS&E Area Engineer that the OSA has been returned to the Responsible User/Supervisor for changes

3.10 Responsible User/Supervisor and HS&E Area Engineer. If the OSA is not approved, make the necessary changes and return the OSA to the HS&E Area Engineer for review. The HS&E Area Engineer will forward the OSA to the Area Safety Team, which will concur with the change[s] and re-submit the OSA to the Approval Authority or, if not in agreement, the OSA will be scheduled for further discussion.

If the OSA is approved, the OSA, all original comment sheets, and the original Title and Approval Sheet will be returned to HSE Area Management, for distribution to the Approval Authority, Responsible User/Supervisor, HS&E Area Engineer, and permanent repository.

3 11 Responsible User The Responsible User [designated by the Approval Authority and the supervisor], will be responsible for disseminating the hazards identification and control measures contained in the OSA to the involved employees. The following requirements are mandatory·

** Discuss OSA at DOCUMENTED safety meetings at least annually, or whenever changes occur, if more frequent

** Have employees read and acknowledge by signing a sheet attached to the inside front cover of the OSA

4 SUBSEQUENT REVIEW OF APPROVED OSAs [AT LEAST ANNUALLY]

4.1 HSE Area Management One month in advance, HSE Area Management, will notify the Area Engineer and the Responsible User that the OSA is due for review

4 2 Responsible User/Supervisor Review operation and the OSA with the HS&E Area Engineer

4.3 HS&E Area Engineer If no significant changes have occurred, the HS&E Area Engineer will notify HSE Area Management, in writing, that the review has been completed HSE Area Management will document and notify the Approval Authority and Responsible User that the review has been successfully completed

4 4 During the annual review, if the User decides the OSA is acceptable for continued use, he/she will send a letter to the HS&E Area Engineer, which verifies this decision

5 OPERATIONAL CHANGE CONTROL

5.1 Responsible User and HS&E Area Engineer· Minor changes to the OSA prior to subsequent reviews, may be approved by the Responsible User-Supervisor and the HS&E Area Engineer.

5.2 HS&E Area Engineer and Area Safety Team:

5.2.1 If a significant change has been identified by the Responsible User/Supervisor or the HS&E Area Engineer since the last review, review the OSA following the procedure outlined in Section 3.6.

5.2.2 If the change requires the operation to be shutdown, the HS&E Area Engineer will notify the Responsible User/Supervisor.

5.2.3 Examples of Significant Change Are:

** Any change in operation altering the flow of process materials.
** Any addition, replacement, modification, or relocation of equipment.
** Any deviation in construction material[s] from the original, such as stainless steel to PVC.
** Any change in glovebox [e.g., sumps in floor, fire doors that block access to criticality drain]
** Any chemical changes or quantity changes in a process
** Any relocation of a process or operation within a room building, or from building to building.
** Any change in a ventilation system
** Any change in quantity and/or form of radioactive materials in a process or operation
** Any change in temperature or pressure parameters of equipment.
** Any change in personnel protective equipment requirements, such as shielding, respiratory protection, eye/face protection, hand protection, etc.
** Any changes in construction materials used to install a wall or relocation of a wall or installation of new walls, such as dividing a room into smaller sections.

The above examples are to be used as a guide and may not cover all areas of concern HS&E can deem a change significant based on their expertise. Therefore, judgment must be used any time that a change occurs to ensure that appropriate reviews are made

5 3 HS&E Area Engineer Review the OSA with the Responsible User/Supervisor to ensure that noted changes are reviewed and incorporated into the OSA as necessary If the operation was shutdown, appropriate changes must be incorporated into the OSA and approved by the Approval Authority before the operation is permitted to proceed Notify HSE Area Management of update

6. AUDITS

6.1 The Area Safety Team will audit operations for compliance with OSA requirements during the annual Multi-Disciplinary Audit.

7. DEACTIVATION OF AN OSA

7.1 Responsible User/Supervisor: Notify the HS&E Area Engineer when an operation covered by an OSA has been deactivated.

7.2 HS&E Area Engineer· The HS&E Area Engineer will, in writing, notify HSE Area Management when an OSA has been deactivated. At that time, the original OSA will be turned over to the HSE Area Engineer for retention or disposal.

8. RE-ACTIVATION OF AN OSA

8.1 Responsible User/Supervisor Notify the HS&E Area Engineer that the OSA should be re-activated.

DRAFT

APPENDIX A

APPROVAL AUTHORITIES

DIRECTOR	SUPPORT OPERATIONS
DIRECTOR	PRODUCTION OPERATIONS
DIRECTOR	QUALITY ENGINEERING & CONTROL
DIRECTOR	FINANCE & RESOURCE MANAGEMENT
DIRECTOR	PLUTONIUM OPERATIONS
DIRECTOR	HEALTH, SAFETY & ENVIRONMENT
DIRECTOR	PLANT SECURITY
DIRECTOR	SAFEGUARDS & MATERIALS MANAGEMENT

APPENDIX B

OPERATIONAL SAFETY ANALYSIS [OSA]

OSA NUMBER________

TITLE____

OPERATION

Briefly describe operation covered by the OSA The description should include a statement of principle operation, type[s] of material to be worked, statement of principle hazard[s], sequence of the operation, including location of operation, building, room; and any special conditions that should be considered

RESPONSIBILITY

____
[Name] [Position] [Organization]

is responsible for this operation It is his/her responsibility to ensure the operation is carried out in accordance with the OSA and that employees performing this operation are familiar with the document

CHANGES

No changes will be made in this OSA without coordinating the change through the HS&E Area Engineer He/she will determine if additional reviews and/or approvals are necessary

CONCURRENCE

________________________ ________________
Director, HS&E [Signature] Concurrence Date

APPROVAL AUTHORITY

____
[Type Name and Title of Approval Authority]

is the final Approval Authority for this OSA.

________________________ ________________
Approval Authority [Signature] Approval Date

CLASSIFICATION
STAMP HERE

APPENDIX C

OPERATIONAL SAFETY ANALYSIS [OSA]

OSA #________

TITLE____

RESPONSIBLE ORGANIZATION

General Hazard Review & Control

Basic Job Steps	Potential Hazard	Hazard Control

APPENDIX D
H&SE - OPERATIONAL SAFETY ANALYSIS [OSA] REVIEW SHEET

NAME	DISCIPLINE	BLDG	EXT	PAGE
[Team Leader]	HSE AREA ENGINEER			
	Criticality Engr			
	Environ. Mgmt.			
	Health Physics			
	Industrial Hygiene			
	I & S S E			
	Safety Analysis			
	Fire Department			

OSA #__________ OSA TITLE______________________________________

AUTHOR______________________________________ EXT.

Review the attached copy of the subject OSA and indicate required changes, additions, or your approval in the space below

_____ NO meeting is scheduled Return comments by ____________________

_____ A Safety Team Review meeting IS scheduled for·[time/date]______ ____________ [bldg/room]____________ to discuss the OSA and operation
PLEASE PLAN TO ATTEND AND SUBMIT YOUR REQUIREMENTS
****

C O M M E N T S
[Use Reverse If Necessary]

____

____

____

____

____

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____

____

____

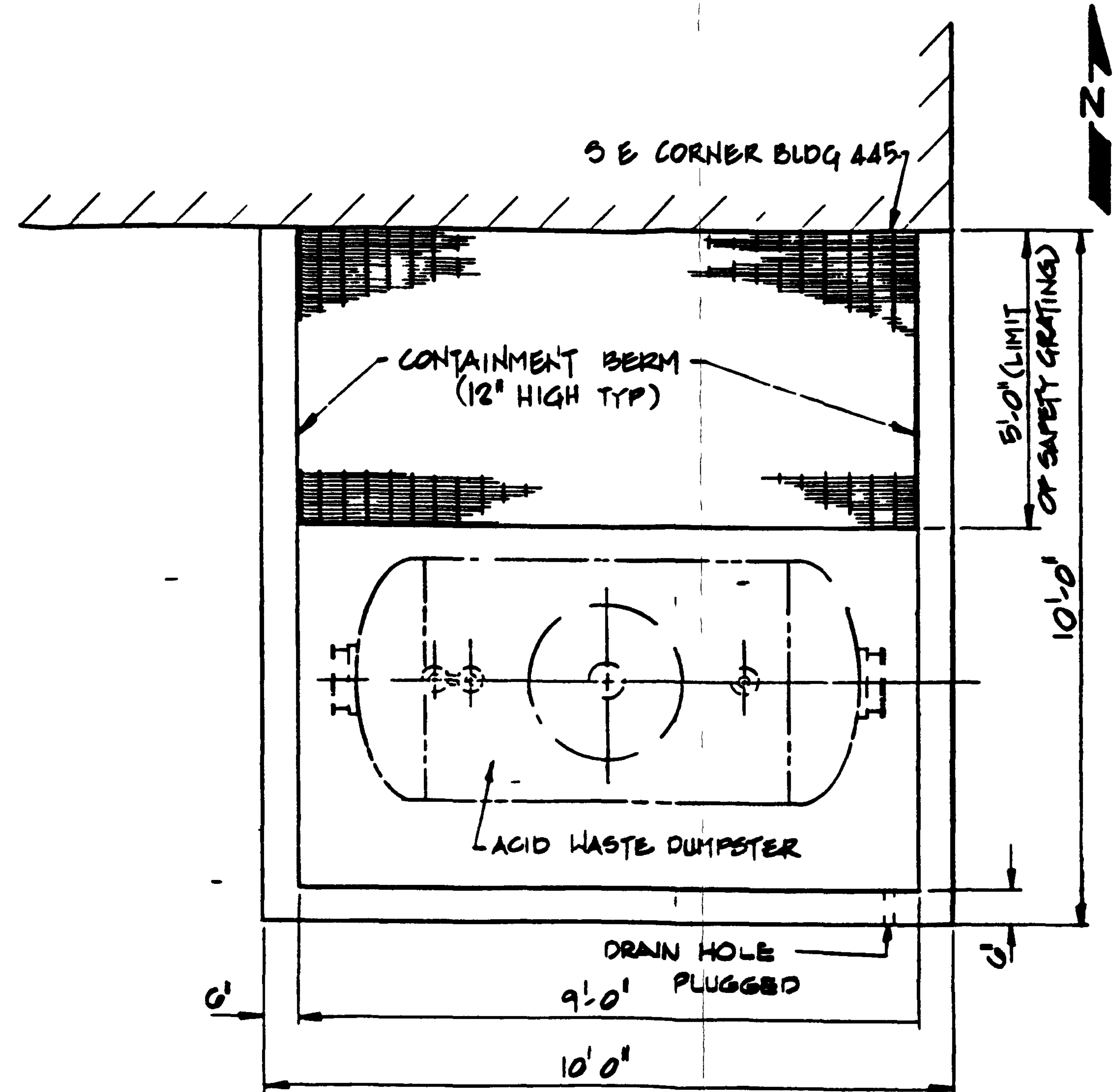
____

SIGNATURE:______________________ DATE:______________________________

BERM VOLUME CALCULATION

VOLUME = 9.5' x 9.0' x 1'0 x $\frac{7.481 \text{ GAL}}{\text{FT}^3}$ = 640 GAL

DUMPSTER VOLUME IS 500 GAL THEREFORE
BERM IS ADEQUATE

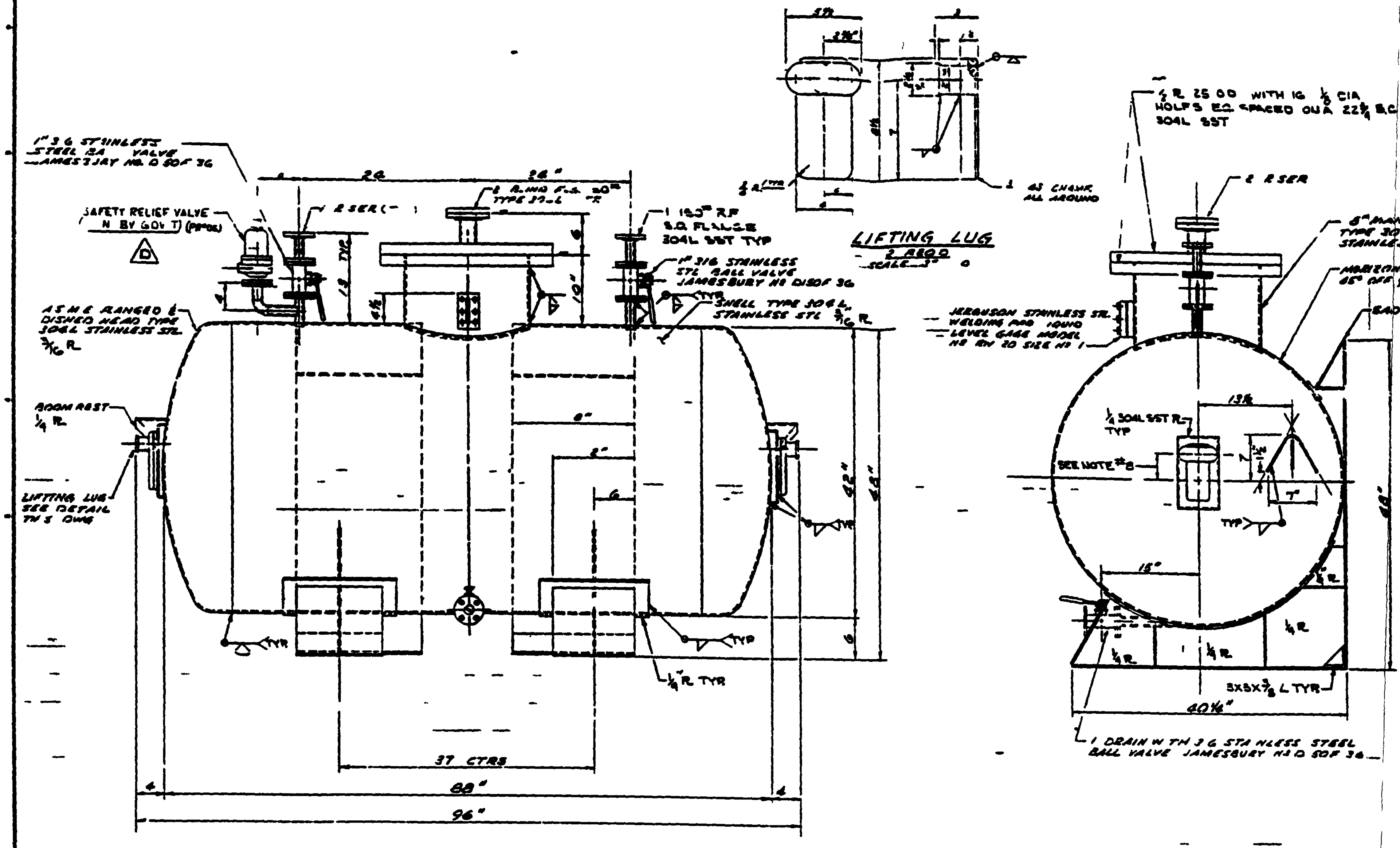


37805 003

WESTON
215 Union Boulevard
Suite 600
Lakewood CO 80228
(303) 980 6800

ROCKWELL INTERNATIONAL
Rocky Flats Plant
Golden CO
Figure 3
ACID DUMPSTER BERM
Bldg 444

September 30 1988



NOTES

1. The tank and all stainless steel connections shall be fabricated according to Dow Specification A-11869, Rev "F" High Quality Stainless Steel Welding Requirements. Stainless steel welding to be performed only by TIG or MIG welding processes. No manual shielded metal arc welding permitted.
2. All carbon steel tank supports shall be fabricated according to Dow Specification No A-11725 Rev. "E" "Standard Specification Carbon Steel Welding Requirements"
3. Stainless steel pads between carbon steel tank supports and the tank shell shall extend 2" in all directions from the carbon steel supports, and shall be 100% seal-welded to shell. Carbon steel parts shall be welded only to these pads and not to tank shell itself.
4. The nameplate shall be 3" 5" 14 ga. 304L stainless steel and will include the following information in 1/4" high letters:

   Manufacturer's Name
   Buyer's Purchase Order Number
   Specification No. [illegible]913 (R-89)
   Capacity in Gallons ______
   Material: 304L stainless steel

5. Test Requirements
   a. Dye penetrant test all stainless steel welds on tank shell, nozzles, level glass and structural pads.
   b. Hydrostatically test tank at 20 psig for one hour. No deformation or other unusual effects shall be allowed.
   c. Leak test all joints with bubble-type leak detection solution with tank pressurized to 10 psig with air.
   d. Visually check all dimensions to insure compliance with drawing.
6. Carbon steel base shall be sandblasted to white metal, washed with "Tenemec" thinner, primed with one coat of "Tenemec" primer and finished with two coats of "Tenemec" No. 112 gray epoxy enamel. An equal epoxy system such as Pittsburg Plate Glass Company's epoxy, Devcon "Epoxy Coat" or DuPont "Corlar" may also be used, and finish shall be light gray in color.
7. Preliminary inspection and tests to be performed at Seller's plant and witnessed by the Buyer's representative. Final acceptance to be at the Buyer's Rocky Flats Plant.
8. The composite center of gravity of the tank assembly full of liquid shall be determined by the Seller. The center line of the lifting pin shall then be located 4" to 7" above the composite center of gravity.
9. All flanges ASA S O R F 150# type 304L SST. All bolt holes to straddle center line. All gaskets to be 1/8" thick Teflon.

WESTON

215 Union Boulevard
Suite 600
Lakewood, CO 80228
(303) 980-6800

ROCKWELL INTERNATIONAL
Rocky Flats Plant
Golden CO
Figure 4
ACID DUMPSTER
Bldg 444

September 30 1988